WETLAND PROGRAM GRANT PROPOSAL
TITLE PAGE

PROJECT TITLE: EXPANDED DEVELOPMENT OF METHODS AND STANDARDS FOR THE ASSESSMENT OF THE BIOLOGICAL CONDITION OF UTAH DEPRESSIONAL WETLANDS

SPONSORING AGENCY
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REVIEW TEAM PROPOSAL CHECKLIST

Please check the boxes for each component that your proposal meets and return with your proposal

The purpose of the following checklist is to assist EPA in assuring all proposals are reviewed by the appropriate program experts and / or teams and is not intended to reflect priorities for funding. All proposals will be screened for eligibility under each of the grant programs described in the RFP and all eligible grant applications will be considered for funding. An EPA review panel will make the final determination regarding under which grant programs the project or separable components of a project may be considered.

X ***I am willing to accept funding at a lower level than my request, or partial funding covering some project components, OR***

9 ***I am not willing to accept funding at a lower level than my request***

Geographic & Special Emphasis Areas:
1-70 Corridor (Golden to Glenwood Springs)
Upper Missouri River Basin
Yellowstone River Corridor, Montana
Missouri Wild and Scenic/Recreational Rivers, Montana/South Dakota
Big Sioux River Basin, South Dakota
Missouri River Mainstem Garrison reach, North Dakota
Missouri River Mainstem Fort Peck reach, Montana/North Dakota
Red River/Devils Lake Basin, North Dakota/Minnesota
Cherry Creek Watershed, Colorado
State/Tribal Unified Watershed Assessment high-priority watershed
Watershed Affected by CBM Development (Montana, Wyoming, Utah, Colorado)
X   Assessment or monitoring
9   Volunteer Monitoring

Water Program:
Pretreatment
Biosolids
Wet Weather (e.g. storm water, sanitary sewer overflows)
Concentrated Animal Feeding Operations
Wastewater
Coal Bed Methane
Mining
Reduction, Prevention, or Elimination of Pollutants in Surface Water

Wetland Program areas:
X   Project directly related to wetlands protection or assessment.

TMDL Development:
End product is an assessment or monitoring information related to a 303(d) listed waterbody for the development of a TMDL
End product is an assessment of a 303(d) listed waterbody
End product is a TMDL for a 303(d) listed waterbody
End product is implementation of a TMDL

Regional Geographic Initiative
X   Addresses Geographic and / or Special Emphasis areas listed above
X   Addresses environmental issues on a landscape scale using a multi-media or multi-program approach
X   Leverages resources from and builds relationships in a variety of programs and agencies aimed towards environmental results
Creates a strategy/plan for focusing resources and community approaches to environmental problem-solving

1.0 WETLAND PROJECT EXECUTIVE SUMMARY SHEET

PROJECT TITLE: EXPANDED DEVELOPMENT OF METHODS AND STANDARDS FOR THE ASSESSMENT OF THE BIOLOGICAL CONDITION OF UTAH DEPRESSIONAL WETLANDS

NAME AND ADDRESS OF LEAD PROJECT SPONSOR / STATE CONTACT PERSON
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ENVIRONMENTAL SETTING / PROBLEMS
The environmental setting for the project is a subset of all depressional wetlands in the state of Utah ecoregions of the Great Basin, Colorado Plateau and Rocky Mountains. We currently have collected data on many depressional wetlands in the greater Great Salt Lake ecosystem. These are almost exclusively moderately to highly saline depressions on mineral substrates with little or no soil development. By expanding into other ecosystems, we can investigate the characteristics of depressions that are fresher, are at different elevations and have different soils (peat rather than mineral). With this information we can better determine the natural range of variation of depressional wetlands in order to develop relationships between vegetation and macroinvertebrates for additional subclasses. This information can be used to increase our knowledge of isolated wetlands and provide methods to assist is their protection and provide additional tools and methods for designing compensatory mitigation.

SUMMARIZATION OF MAJOR GOALS
1) Collect data biological, chemical and environmental data for depressional wetlands in the Great Basin, Colorado Plateau and Rocky Mountain ecoregions of Utah. 2) Use this data to refine and expand the subclasses of depressional wetlands based on their natural variation .3) For the most common of these subclasses, develop reference standards for vegetation and macroinvertebrates based on reference standard sites within each selected subclass. 4) For these same subclasses investigate disturbed sites to determine the effects on vegetation and macroinvertebrates of various kinds and degrees of human disturbance.

PROJECT DESCRIPTION
Develop reference standards for the bioassessment of subclasses of depressional wetlands throughout Utah by collecting and analyzing biological, chemical and environmental data for reference condition sites in the Great Basin, Colorado Plateau and Rocky mountain ecoregions.

FY 104(b)(3) funds requested $ 89,343.00   **Match $ 29,483.00**

Other Federal Funds   **Total Project Cost $118,826.00**
WETLAND PROJECT PROPOSAL
FY 03

2.0 ENVIRONMENTAL PROBLEM DESCRIPTION

The environmental setting for the project is a subset of all depressional wetlands in the state of Utah ecoregions of the Great Basin, Colorado Plateau and Rocky Mountains. We currently have collected data on many depressional wetlands in the greater Great Salt Lake ecosystem. We had difficultly collecting data at many sites this past year because of the ongoing drought. Many sites that we had planned on using as reference sites were completely dry this year, including sites that I have never seen dry in past years. The sites that we have currently are almost exclusively highly saline depressions on mineral substrates with little or no soil development. By expanding into other ecosystems, we can investigate the characteristics of depressions that are fresher, are at different elevations and have different soils (peat rather than mineral). With this information we can better determine the natural range of variation of depressional wetlands. Our present subclasses of depressions are based on ecoregion, mineral or peat substrate, soil pH and salinity as determined by multivariate analysis of our existing data (see attached HGM classification for depressional wetlands). We are attempting to relate vegetation and macroinvertebrate data (BugLab) to some of the subclasses of saline depressions for reference standard wetlands in those subclasses. We wish to expanded this to other subclasses of depressional wetlands, continuing to develop relationships between vegetation and macroinvertebrates for subclasses. In addition, we plan to test development of shorebird data for a few subclasses of the GSL depressional subclasses (see proposal from SWCA). This information can be used to increase our knowledge of isolated wetlands and provide methods to assist is their protection and provide additional tools and methods for designing compensatory mitigation.

3.0 GOALS OF THE PROJECT

1). Collect data biological, chemical and environmental data for depressional wetlands in the Great Basin, Colorado Plateau and Rocky Mountain ecoregions of Utah.

2). Use this data to refine and expand the subclasses of depressional wetlands based on their natural variation.

3). For the most common of these subclasses, develop reference standards for vegetation and macroinvertebrates based on reference standard sites within each selected subclass.

4). For these same subclasses investigate disturbed sites to determine the effects on vegetation and macroinvertebrates of various kinds and degrees of human disturbance.

5). Investigate the relationship between shorebirds and selected subclasses of saline wetlands in the GSL region.

4.0 PROJECT DESCRIPTION

Ecosystems targeted by project and Project location: depressional wetlands in the state of Utah ecoregions of the Great Basin, Colorado Plateau and Rocky Mountain

Background information: We currently have collected data on many depressional wetlands in the greater Great Salt Lake ecosystem. These are almost exclusively moderately to highly saline depressions on mineral substrates with little or no soil development..Our present subclasses of depressions are based on ecoregion, mineral or peat substrate, soil pH and salinity as determined by multivariate analysis of our existing data (generally based on principles of HGM- see attached HGM classification for depressional wetlands). We are attempting to relate vegetation and macroinvertebrate data to some of the subclasses of saline depressions for reference standard wetlands in those subclasses.

D. Work to be completed: Gather information on possible reference conditions sites from the Forest

Service, BLM, sites previously sampled by the BugLab at USU, Fish and Wildlife Service and Wildlife Resources, among others. This will be done by Nancy Keate (myself) and Brooke Bushman (BugLab and field assistant).

Collect data biological, chemical and environmental data for depressional wetlands in the Great Basin, Colorado Plateau and Rocky Mountain ecoregions of Utah. To be accomplished by Nancy Keate and two field assistants.

Use this data to refine and expand the subclasses of depressional wetlands based on their natural variation. Analyzed by Nancy Keate and reviewed by peers in Forest Service, Wildlife agencies, NRCS wetland specialists, etc.

For the most common of these subclasses, develop reference standards for vegetation and macroinvertebrates (BugLab at USU) based on reference standard sites within each selected subclass. Accomplished by Nancy Keate and reviewed by peers in Forest Service, Wildlife agencies, NRCS wetland specialists, etc

For these same subclasses investigate disturbed sites to determine the effects on vegetation and macroinvertebrates of various kinds and degrees of human disturbance. **This will be accomplished in subsequent years.**

Investigate the relationship between shorebirds and selected subclasses of saline wetlands in the GSL region. Nancy Keate and SWCA staff ecologists (consulting company with a great deal of existing data). A proposal is submitted separately for their portion of this work..

Coordinate with DEQ Water Quality in their investigation of nutrient loading in the Farmington Bay wetlands by providing previous data on similar wetlands, as well as new data collection for reference wetlands comparable to those in the Farmington Bay area.

This work will require Nancy Keate full time for one year or more, two field assistants full time from April - October. An undetermined number of hours will be required of personnel from SWCA and Mark Vinson and his assistants at the BugLab at USU (funds remaining from a previous grant).

Equipment needs, sampling and analysis - we have most of our field equipment from previous years. We will require the analysis of soil (Soil Lab at USU) and water samples (state Water Lab). We must provide containers for soil samples, but water sample containers are provide by the state Water Lab. Nancy Keate has the SPSS program for the analysis of the data.

In addition, we will continue building our annotated bibliography of the distance effects and impacts to wildlife of disturbance and geochemical distance effects to wetlands. We now have over 100 articles entered and more than 100 collected but not yet annotated and entered. When we reach around 200 articles we will be uploading the bibliography to the internet.

4.0   OUTPUT AND PROGRESS REPORTS

Approximately four field days per week from April - October.

Spread sheets with all data collected and compiled by site.

Documents detailing results of the data analysis, revised and expanded depressional subclasses, relationships determined for selected subclasses, their vegetation and macroinvertebrates.

Documents detailing the results of the studies done in collaboration with SWCA and Water Quality.

Annotated bibliography.

Progress reports will be delivered semi annually and will included the summary report sheet and any documents or drafts that have been produced.

5.0 MILESTONES

	Month	1	2	3	4	5	6	7	8	9	10	11	12
Task													
Gather info on possible sites		X	X										
Collect field data				X	X	X	X	X	X				
Analysis of data/ peer review/ refinements									X	X	X	X	X	
Complete reports on results													X	X

6.0   BUDGET

	EPA Funds		State Match
Salary			
Wetland Program Manager	$43,429.00		$15,083.00
Benefits			
Wetland Program Manager	$16,900.00		
Salary			
field assistants	$15,701.00		
Equipment/Supplies			
Field	$ 500.00	Office / software	$ 1,130.00
Sampling			
Soil analysis	$2,590.00		
Water analysis	$2,800.00		
Travel			
Vehicles lease	$2,383.00		$2,383.00
mileage			
per diem	$2,790.00		
Conferences			
Regional	$ 750.00		
National	$ 1,500.00		
Training			$ 500.00
Other			$10,287.00 (in kind & Current expenses)
Total	**$89,343.00**		**$29,483.00**

Physiographic province
> 1. Rocky Mountain/High Plateaus
> 2. Great Basin/Colorado Plateau

I. Riverine wetlands: Occur in floodplains and riparian corridors in association with stream channels / water source is overbank flow or hydraulic connection between wetland and stream / dominant hydrodynamics is unidirectional, horizontal.

Subclasses--Single Channel Systems:

A   Very steep gradient, very entrenched (no floodplain), very narrow valley, narrow channel
Entrenchment ratio < 1.4 Width/depth ratio < 12 Gradient $\geq$ .04

G   Deeply incised, grade control problems (headcuts), much bank erosion, high sediment supply, virtually no floodplain
Entrenchment ratio <1.4 Width/depth ratio < 12 Gradient $\geq$ .02

F   Entrenched, little floodplain development, low gradient, unstable banks, significant bar deposition, increasing channel width, high sediment supply, channel wide and shallow
Entrenchment ratio $\leq$ 1.5 Width/depth ratio $\geq$ 12 Gradient $\leq$ .02

B   Narrow, gently sloping valleys, colluvial deposition from side slopes and/or structural control restrict width of floodplain but there is a small, relatively flat floodplain, low sediment supply, well-vegetated
Entrenchment ratio 1.5-2.0 Width/depth ratio $\geq$ 12
Gradient $\geq$ .02   B
Gradient < .02 B_C

C   Low gradient, slightly entrenched, well-defined floodplain with terraces, point bars, cut banks, developed in alluvial material, often bare below bankfull/ cottonwood-willow complexes
Entrenchment ratio $\geq$ 2.0 Gradient < .02
Width/depth ratio $\geq$ 12 C
Width/depth ratio < 12 C_G

E   Low gradient, narrow, deep channels in broad valleys/meadows, large floodplains, little sediment deposition, well-vegetated willow/sedges, sinuous, overhanging banks
Entrenchment ratio $\geq$ 2.0   Width/depth ratio < 12 Gradient < .01

Multichannel Systems
D   Abundant sediment supply, shifting channels, very broad floodplains

Soil pH range

Organic soils		Mineral soils	
0	$\leq$ 4.9	0	$\leq$ 6.0
1	5.0 - 6.5	1 6.1-7.3	
2	> 6.5	2	$\geq$ 7.4 - 8.4
		3	$\geq$ 8.5

Soil salinity

0	< 2 dS/m
1	2 - 4 dS/m
2	4 - 8 dS/m
3	8 - 16 dS/m
4	$\geq$ 16 dS/m

II. Slope wetlands – Occur at points of surface changes, breaks in slope or stratigraphic changes / groundwater is primary water source / water flow is primarily unidirectional- down gradient / water may discharge to stream, lake, depression.

Subclasses

Organic (0)or mineral soils (1)

Soils are classified as organic if they are 20% or more organic carbon by weight. A soil is classified as an organic soil (Histosol) if more than half of the upper 80 cm (32 in) of the soil is organic or if the organic soil material of any thickness rests of rock or fragmental material having interstices filled with organic materials. In general, peat material needs to be 24 in in depth to be considered an organic soil.

Depth of internal free water

0   water on the surface
1   water < 20 in
2   water table ≥ 20 in.

Soil pH range

Organic soils			Mineral soils	
0	≤ 4.9		0	≤ 6.0
1	5.0 - 6.5	1	6.1-7.3	
2	> 6.5		2	≥ 7.4 - 8.4
			3	≥ 8.5

Soil salinity

0   < 2 dS/m
1   2 - 4 dS/m
2   4 - 8 dS/m
3   8 - 16 dS/m
4   ≥ 16 dS/m

      For GSL wetlands add as first number 1 for greater than or equal to 4214 ft and 0 for less than 4214 ft. Utah Lake high elevation was 4495 ft in the eighties. Organic and mineral is not listed as there are only small portions of organic soils in the area of Salt Creek and Benjamin Slough.

      For montane wetlands, salinity is not listed as all are nonsaline.

III. Depressional wetlands- Topographic depression with closed contours / water sources are precipitation, runoff, groundwater / water flow vectors are toward the center of the depression / dominant hydrodynamics are vertical / may or may not have inlets or outlets.

Subclasses

Water Class ??
3   Ephemeral - surface water is present for brief periods during the growing season (playas).
2   Seasonal - surface water is present for extended periods in the growing season.
1   Saturated - throughout the growing season water table is at or near the surface.
0   Ponded - surface water is present throughout the growing season

Soil pH range

Organic soils			Mineral soils	
0	≤ 4.9		0	≤ 6.0
1	5.0 - 6.5	1	6.1-7.3	
2	> 6.5		2	≥ 7.4 - 8.4
			3	≥ 8.5

Soil salinity

0	< 2 dS/m
1	2 - 4 dS/m
2	4 - 8 dS/m
3	8 - 16 dS/m
4	≥ 16 dS/m

IV. Mineral flat wetlands- Occur on large relict lakebeds / dominant water source is precipitation / dominant hydrodynamics are vertical. Great Salt Lake mudflats/ salt flats
   Subclasses not known

V. Lacustrine fringe wetlands - Adjacent to large lakes and reservoirs whose area is greater than 20 acres / dominant water source is lake water level / hydrodynamics are bidirectional / subject to waves and seiches.

   Saline lacustrine fringe– Great Salt Lake fringe - lacustrine fringe is the current lake level plus 2 feet.

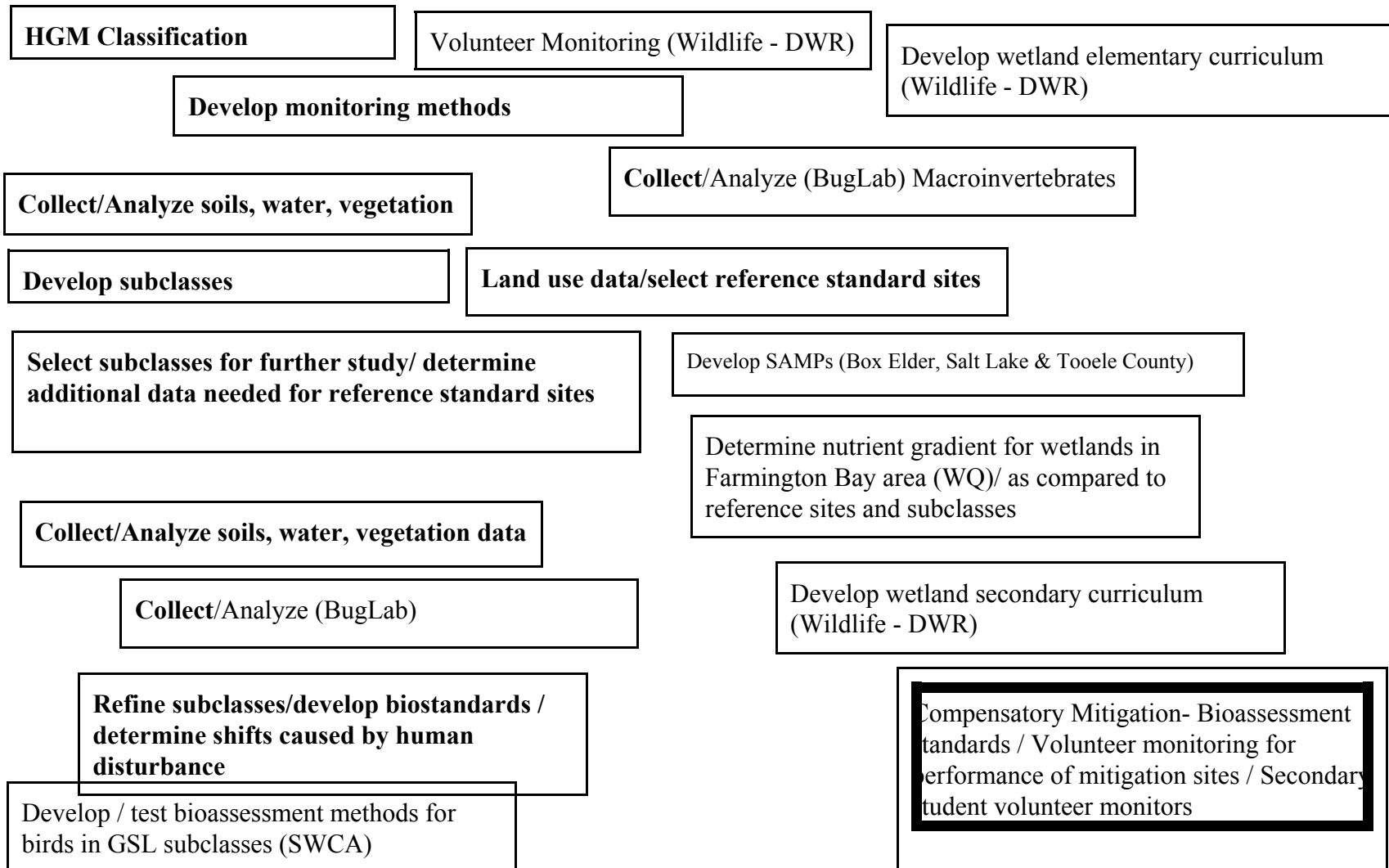   Fresh lacustrine fringe– fringes of lakes or reservoirs.

Additional subclasses not known.

   Within the depressional and wet meadow subclasses there is an additional subclass indicator if the wetlands are at or below 4212 ft in the area surrounding Great Salt Lake. These wetlands have dual hydrology. The primary hydrology defines the subclass of depression or slope, but the secondary hydrology of rising and falling lake levels defines a hydrologic disturbance regime. Around Utah Lake the high elevation is 4495 ft. These are not lacustrine fringe wetlands because the dominant water source is not the lake.

Possible addition to subclassing

Salinity for water

Fresh - < 2 dS/m
Brackish - 2 - 15 dS/m
Saline - 15 - 45 dS/m
Extreme Saline - ≥ 45 dS/m
or
Fresh - < .8 dS
Slightly saline - .8 - 8.0 dS
Moderately saline - 8.0 - 30.0 dS
Saline - 30.0 - 45.0 dS
Extreme saline - ≥ 45 dS/m

HGM Classification

Volunteer Monitoring (Wildlife - DWR)

Develop wetland elementary curriculum (Wildlife - DWR)

Develop monitoring methods

Collect/Analyze (BugLab) Macroinvertebrates

Collect/Analyze soils, water, vegetation

Develop subclasses

Land use data/select reference standard sites

Select subclasses for further study/ determine additional data needed for reference standard sites

Develop SAMPs (Box Elder, Salt Lake & Tooele County)

Determine nutrient gradient for wetlands in Farmington Bay area (WQ)/ as compared to reference sites and subclasses

Collect/Analyze soils, water, vegetation data

Collect/Analyze (BugLab)

Develop wetland secondary curriculum (Wildlife - DWR)

Refine subclasses/develop biostandards / determine shifts caused by human disturbance

Compensatory Mitigation- Bioassessment standards / Volunteer monitoring for performance of mitigation sites / Secondary student volunteer monitors

Develop / test bioassessment methods for birds in GSL subclasses (SWCA)

CURRENT & FUTURE UTAH WETLAND PROGRAM DEVELOPMENT
     Items in bold print are DNR Administration - Nancy Keate